West Virginia
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JOURNAL
West Virginia State Medical Association

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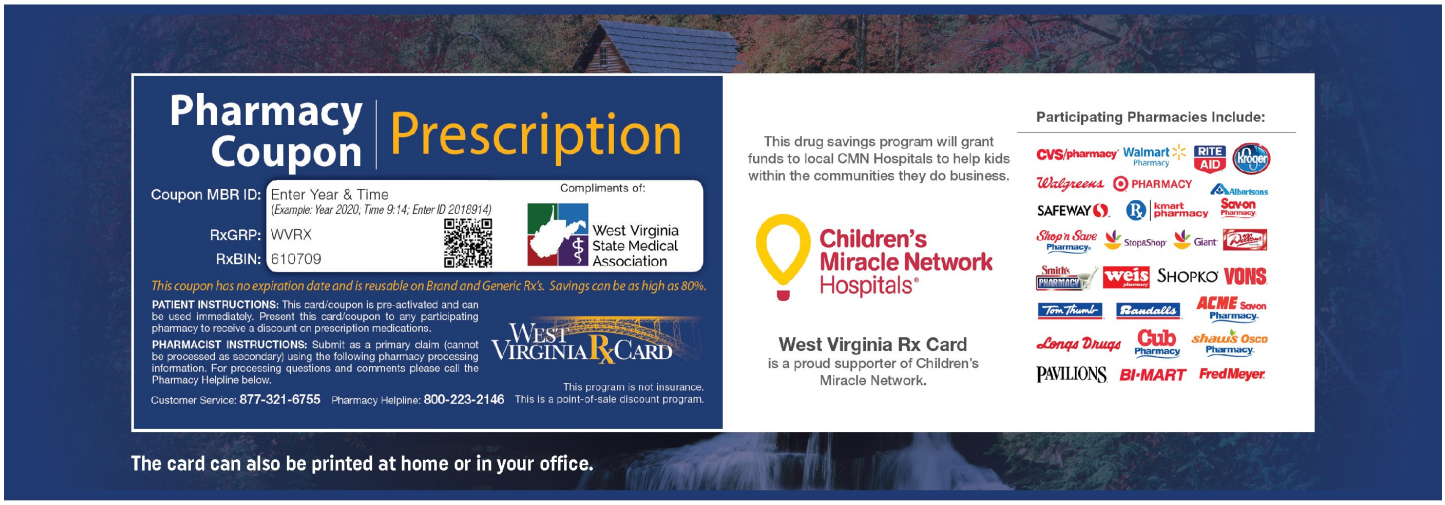

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Retiring *West Virginia Medical Journal editor,* Dr. Tom Sporck in 2007.

The West Virginia Medical Journal is published quarterly by the West Virginia State Medical Association, 2018 Kanawha Blvd., E, Charleston, WV 25311, under the direction of the Publications Committee. The views expressed in the Journal are those of the individual authors and do not necessarily reflect the policies or opinions of the Journal's editor, associate editors, the WVSMA and affiliate organizations and their staff. Periodical postage paid at Charleston, West Virginia and other cities.

West Virginia Osteopathic School of Medicine Virtual Commencement Address

***Sherri A. Young**, DO, FAAFP, President, West Virginia State Medical Association*

Dr. Nemitz, members of the Osteopathic School faculty, friends and graduates. I am beyond honored to be delivering this address.

I'd like to impress you by quoting some old, German-speaking philosopher. John Lennon said it best, "Life is what happens while you're making other plans."

Four years ago, when you started medical school, you planned to be on a stage today. You were getting a degree. Mom and dad and grandma and grandpa were going to be there. You were getting your picture made and celebrating. We're celebrating but in a different way when words like social distancing have become part of our healthcare lexicon. We're doing a lot of things differently.

Before, there would be a huge tent with thousands of people. Now, you're watching graduation at home by yourselves, with a couple of family members or loved ones. This is a different time. Life happens.

I had a plan when I was in your place in 2003. I was going to be a family doctor and see my patients for thirty years and grow old with them. I didn't plan to be a state immunization officer or run a local health department during a pandemic.

The pandemic has shown us we need to take opportunities where we can. Work together. Know that when something is this big, you're not alone.

The West Virginia School of Osteopathic Medicine is family. It's kinship. It's that fellowship I'm the most impressed with. I watched my dad go through WVSOM when I was in high school. He wasn't your typical student. He graduated in 1991. He was accepted in the class of 1985. My grandfather was very, very sick. After my grandfather died, my father went back to school later in life. He came home and talked about all of his professors. He had so much help from all the professors who truly cared if he made it. His class had about 40 people. They were all close-knit. They knew each other. They all were happy to see each other.

The pandemic has shown us we need to take opportunities where we can. Work together. Know that when something is this big, you're not alone.

His professors, when I met them at his graduation, wanted to meet me. They wanted to know about the family. It wasn't just about, "you're a number and you're a graduate and here's your degree." They embraced my dad and our whole family.

The DO's who settled this school in Lewisburg took turns paying the electric bill and rent. The school was started by DO's wanting to train DO's. They weren't accepted. It was a hard life.

Look at the school now. It is beautiful. It's well laid out. It's amazing. That made such an impression on me. I wanted to graduate from there.

I've wanted to be a doctor since I was five. I didn't know my path. I went to West Virginia University. I got my degree in speech pathology. I'm a people person. I didn't want to follow the traditional medical undergraduate degrees of chemistry or biology.

I made the decision to apply to the osteopathic school late in my junior year at West Virginia University. I had been at a WVSOM conference in Morgantown. I met some of the professors and some of the doctors my dad had worked with.

I wanted to be around these people. I fell in love and married one of my classmates, Adam Breinig. He was the boy next door. We completed medical school, did our residencies together, practiced together, and most importantly, had our beautiful thirteen year old, Gabi. They're my rock.

When I arrived at the O school, I began the odyssey of learning to care for people. Caring is part of the school's collective character. That character makes our graduates go into primary care and practice in

rural communities to make a difference in the health of patients who may not otherwise have access to health care.

Entering medical school, we have the urge to care for others. This is where we learn to take care of our patients and each other.

You've learned these wonderful lessons. You're part of the DO family. You're graduating into a family that always supports you no matter what we have to do to piece together your careers and discover this new normal.

You're going to pick up the pieces from the COVID pandemic figure out where we go from here. You are part of history. You can't do it alone. It's a different time. We're away from each other at graduation. It feels isolating. Don't forget where you come from, because your family is still there. Your DO family is here. Your DO family will always be here.

That's going to help you when you get out into your own practice. We're not letting you go on a path by yourself and saying, "go figure it out." You have DOs in the field, all over the state, all over this country who are going to take you by the hand and say, "We're going to get you through this, and we're going to train you. And you're going to be great leaders one day."

Residency is tough. It's a new, different kind of tough. When you start medical school, you're at the finish line because you worked so hard to get there. Once you survive four years and get that degree, you know the rough part is over.

When you're in medical school going through your training, you're constantly managed. People are watching over you and guiding you. In residency, you have new freedoms. It's not always a good thing. It can be very scary. You learn to handle things on your own and trust your residents and your interns and your chief resident. Residency is so important. You have the medical knowledge. Residency teaches you to make it work. Everything in our world has changed. As students, you remember when everything was in a clinical setting. There's going to be a lot more telehealth. We're going to be taking a lot more precautions in our daily lives and practices and encouraging our patients to do so.

A virus has caused just about everything in the world to come to a screeching halt. Everything from the economy to the state and national government. It's changed everything we do in our daily lives.

The West Virginia Osteopathic School of Medicine

You are graduating medical school. After four years of controlled chaos, your life was coming together. Now, we're suddenly pulled apart. The world will never go back to being exactly the way it was. Your professional life is not going to be exactly as you envisioned it. That's not necessarily a bad thing.

During the pandemic, we've learned a thing or two about washing our hands and keeping our social distance. We're a little more human and realize we are vulnerable and that a virus could take us all out.

You will pick up the pieces from the COVID pandemic and figure out where we go from here. You are the arbiters of the new normal.

We are not invincible. You're human. Don't be afraid to cry. Don't be afraid to be afraid. The first pulse you take at any emergency is your own. Know that you can't fix everything no matter how bad you want to.

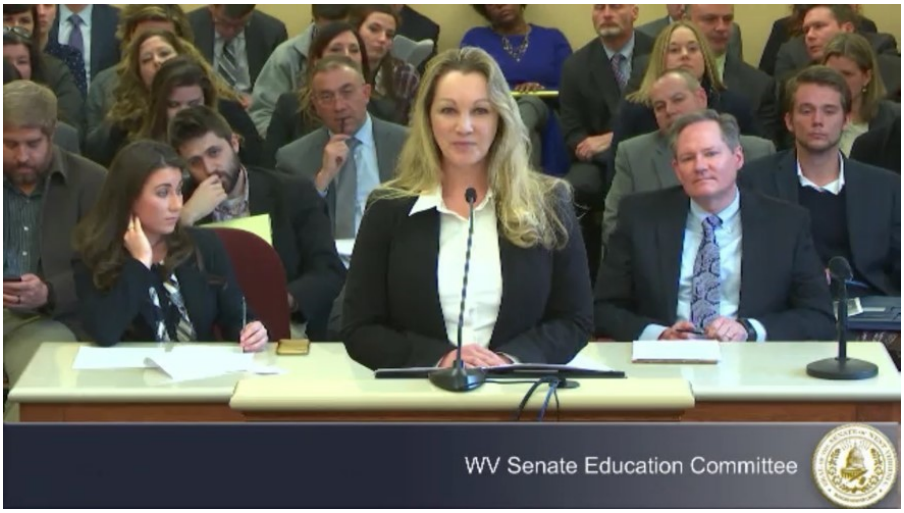
The osteopathic school prepared me for everything I have going on today. I learned to be a leader by working with others. That's unique to the osteopathic field. Everyone on your team—other physicians, specialists, nurses, everybody in the medical field and beyond is important. Listen to their advice.

What I learned at the O school prepared me to be in a public health

PRESIDENT'S MESSAGE

West Virginia Osteopathic School of Medicine Virtual Commencement Address

***Sherri A. Young**, DO, FAAFP, President, West Virginia State Medical Association*



Dr. Young testifying before the WV Senate Education Committee

position where a physician needs to make the medical decisions. So many other decisions are made by my team. Other professions don't teach people to respect, appreciate and love our colleagues like we do.

There's another important team. Join a professional association. I'm just finishing as president of the West Virginia State Medical Association and the West Virginia Chapter of the American Academy of Family Physicians. Membership in a professional association is another way for physicians to talk to each other.

Sometimes, we get away from that. It's something we need to do. I never knew how political medicine was until I became involved with the State Medical Association. I was invited to state medical by a couple of attendings at CAMC, and it stuck. And fourteen years later, I got to be the president. So much policy is made that's not driven by health care professionals. It's scary. Policy affects the lives and outcomes of your patients as much as your prescription pad.

The strong immunization laws we have in West Virginia mean the difference between having measles outbreaks and not having measles outbreaks. Associations advocate to keep these laws in place and to prevent hurtful legislation from going on the books.

I would be remiss if I didn't talk about how women have changed the face of medicine. More women than men are entering medical school. It's wonderful because women are great caregivers. Know this: It's tough to have it all, especially for women. There is a balance between life and family and work. You have to find that balance and decide what works for you and your family. There are days I just want to be with my daughter, but I have a job to do.

The day this is being taped marks Day 70 I and my colleagues have staffed the health command at the Kanawha-Charleston Health Department during the COVID-19 pandemic. It's a collaboration and has been a struggle. I have made new friends and cried in frustration.

Honor every person on your team. Medicine has to be a team. There can't be one person taking care of everything, or it's going to fall apart. It has to be a team telling you when to eat and when to sleep. If it's a bad decision or a good decision, or something you should just let go. Medicine will be much better when we all work together.

Write your page in history. On behalf of me and Adam, the faculty, and your DO family, I salute you for your accomplishment. Be proud of yourself. Embrace your profession.

Welcome to the family.

Dr. Sporck Colleague Tribute

***Charles Schade**, MD*

I don't remember exactly when I first met Tom Sporck. Probably it was at one of the state medical society's meetings, for he was notable in the leadership. But I always think of him as "F. Thomas Sporck, MD, FACS, Editor" because until recently, I didn't know him any other way.

I first got to know Dr. Sporck as "The Editor," an ominous, Olympian figure who could hurl lightning bolts at manuscripts I submitted—and I submitted at least eight as an author or co-author between 2000 and 2013. Most of the lightning bolts, it turned out, came from reviewers, who were not always happy with my methods or conclusions. So I thought of Dr. Sporck as that guy who makes me rewrite all my perfect papers for the eleventh time.

While writing for Dr. Sporck's journal, I watched it evolve. I noticed that papers related to my specialty (public health) were often appearing, some dealing with critical issues in West Virginia health such as obesity, drug abuse, and HIV infection. A clinical journal that told a public health story was something I could embrace.

I noticed other things as well. Early on, papers could take months from submission to response, but this turn around time slowly but steadily improved. I know it was difficult to herd the cats that comprise the volunteer associate editors and get busy physicians to do timely reviews. At some point, Dr. Sporck tapped me to be a reviewer. Perhaps this was some kind of payback for submitting one too many papers with one too many run-on sentences.

But thanks to Dr. Sporck's invitation, a very rewarding phase of my career began. Although I have reviewed for about half a dozen journals, the *West Virginia State Medical Journal* is the one that leads in volume and variety of papers. Some people may think of reviews as a chore, but I think of them as a privilege; the chance to help get a little piece of scientific knowledge buffed up and into the public's eye.

All of this was before I actually got to know Dr. Sporck as a member of a small retired physicians' breakfast group. Only then did I learn that Tom has a wicked sense of humor and can sneak an awful pun into conversation with a complete deadpan. I am glad I never played poker against him.

So thank you, Dr. Sporck, Editor, mentor, and friend. You served the Journal and the Association with distinction.

FEATURE

WV MUTUAL INSURANCE — CHAIRMAN'S CORNER

***R. Austin Wallace**, MD*
Chairman & CEO

I did a previous commentary about telemedicine in these pages in the March 2018 *West Virginia Medical Journal,* and I would like to update you on newer developments regarding this topic about which you may not aware. The West Virginia Board of Medicine, extremely capably led by Dr. Kishore Challa as Chairman and Mr. Mark Spangler as Executive Director, recently published a piece entitled "Best Practices for Utilizing Telemedicine Technologies" in their December 2019 newsletter. This serves as a valuable guide to navigating the use of telemedicine in the Mountain State during "normal" times (which are anything but at the present—more on that later), so I would like to highlight its key points.

In the following, I quote extensively from it with permission from the WVBOM: "…The establishment of a physician-patient relationship via telemedicine currently requires the use of technology with a secure video component…" Indeed, such a relationship cannot be established using audio and/or text communication solely. However, these communication modalities can be used once a physician-patient relationship is established or when covering call for other physicians in the course of medical practice.

The treatise very accurately notes that telemedicine does not change the prevailing standard of care, and that if there is a telemedicine-only professional relationship between the physician and patient, schedule II controlled substances cannot be prescribed with only two exceptions:

1. Treatment of "… a minor or a patient diagnosed with intellectual or developmental disabilities, neurological disease, Attention Deficit Disorder, Autism, or a traumatic brain injury who is enrolled in a primary or secondary education program…"

2. "…an order to dispense a Schedule II drug to a hospital patient for immediate administration in a hospital…" Further, "… With the exception of pathology and radiology practice, practitioners "… must:

1. Verify the identity and location of the patient;
2. Provide the patient with the identification and qualifications of the practitioner;
3. Provide the patient with the physical location and contact information for the practitioner;
4. Conform to the standard of care;
5. Determine whether (and which) telemedicine technologies are appropriate for the specific patient presentation being evaluated/treated;
6. Obtain consent from the patient to use telemedicine technologies;
7. Conduct all appropriate evaluations and history of the patient consistent with traditional standards of care for the patient presentation; and,
8. Create and maintain health records for the patient which justify the course of treatment and which verify compliance with the requirements of this section…."

With regard to medical records, "… Practitioners have a professional responsibility to maintain written medical records that justify the course of treatment. This is true

whether the patient encounter is in-person or via telemedicine technologies… Practitioners who treat patients via telemedicine are subject to the same professional responsibility requirements as practitioners who operate in traditional medical environments."

I recommend that you print off and keep this very well written WVBOM article as a reference, as it provides extremely useful information promoting best practices in telehealth and thereby helps to prevent physicians from breaching the standard of care and run the risk of a medical liability lawsuit being filed when the COVID-19 public health emergency is no longer in effect.

Indeed, many of you are aware that our Mutual's Risk Management and Underwriting staff members did a fantastic job in putting a white-paper together in March that extensively details the telemedicine/telehealth changes that have occurred during the COVID-19 emergency. This valuable resource is posted on our WVMIC website in addition to the WVSMA website, and it serves as a valuable resource about the current relaxation in telemedicine guidelines during the crisis, including temporarily allowing the use of modalities such as Facetime. However, once the emergency is over, physicians must utilize HIPAA-compliant software platforms for video virtual visits, and a number of these are mentioned in the WVMIC white-paper.

I would like to take this opportunity to congratulate the WVBOM and its physician leaders, Dr. Challa and Dr. Sheth, for their successful advocacy efforts in getting CMS to reimburse telephone telemedicine at the same face-to-face rate as video telemedicine during the COVID-19 crisis. Effective broadband coverage is lacking in many rural areas of our state, so this has definitely significantly improved access to care.

In closing, your West Virginia Mutual Insurance Company is acutely aware of the liability pitfalls that can arise with regard to telemedicine.

Furthermore, we are at the forefront in advocating for legislative measures in this arena that would prove to be beneficial to practicing physicians in concert with the Medical Professional Liability Association, on whose board I sit. We are actively advocating for immunity for healthcare practitioners from medical liability lawsuits arising out of treatment provided or the inability to do elective surgery during this crisis.

Also, it is quite possible that a telemedicine patient might reside in a different state from the West Virginia physician utilizing this technology, and we believe it is crucial that any future Congressional action dealing with venue mandate that medical liability litigation be filed in the state of residence of the physician rather than that of the patient. Unfortunately, the latter represents the current stance of the American Medical Association.

This serves again to emphasize that, as always, you can be assured that your Mutual will continue to advocate for your best interests, as we are **Physicians Insuring Physicians.**

EXPANDING THE ROLE OF WEST VIRGINIA PHARMACISTS: STANDING ORDERS FOR ACCESSIBLE BIRTH CONTROL AND TOBACCO CESSATION

FEATURE

Bruce W. Adkins, *MS, PA*
Director, Office of Community Health Systems and Health Promotion
Bureau for Public Health,
West Virginia Department of Health and Human Resources

Cathy Capps-Amburgey
Former Director, WV Title X Family Planning Program
Office of Maternal, Child and Family Health
Bureau for Public Health,
West Virginia Department of Health and Human Resources

The role of pharmacist continues to evolve along with the population healthcare needs. In addition to dispensing medications and ensuring patient safety, pharmacists take a larger role as medical counselors, educators and advocates. In 2020, the role of a pharmacist will expand in West Virginia due to the passage of two bills during the 2019 West Virginia Legislature Session - Family Planning Access Act (HB2583) and Pharmacist Tobacco Cessation Therapy Act (HB2525).

After execution of the bills by Governor Jim Justice, the West Virginia Department of Health and Human Resources, Bureau for Public Health convened workgroups comprised of state and community partners as subject-matter experts to design the implementation.

Pharmacy Accessible Birth Control (Pharmacy ABC)

Pharmacy ABC is an opportunity to make contraception more accessible to women across the state. It allows pharmacists to dispense self-administered hormonal contraceptives (pill, patch or ring) under a Standing Order of the State Health Officer. By code, services provided through Pharmacy ABC are limited to individuals 18 years or older.

Pharmacists providing the service must first complete a specialized training offered through the University of Oregon (customized for West Virginia) and then register with the WV Board of Pharmacy. Trained pharmacists will provide patient-centered counseling and education on the complete range of contraceptive options following completion of a self-screening risk assessment questionnaire that is used to access safety and appropriateness of various contraceptive methods together.

Patients receiving a new type of contraception, may receive a supply for up to three months; near the end of the 3-month period there is a follow-up consult between the pharmacist and patient in person or telephonic. If no concerns are identified after the follow-up consult, refills will be issued for the remainder of the 12 months. If change is needed, supply of the new product is issued after re-evaluation. If the chosen contraception is a continuation of a prescription, the patient may receive up to 3 months with refills for up to 12 months.

When a contraceptive option is provided, the pharmacist will notify the patient's primary care provider (PCP). Patients must attest to follow-up with their healthcare provider in order to extend the prescription past 12 months. The chosen contraceptive and counseling service will be billed to insurance as applicable.

If the self-screening indicates the patient is not an appropriate candidate for a self-administered contraception method or if the patient prefers a method not available under the Pharmacy ABC, a referral is made to an appropriate healthcare provider. Additionally, the patient is referred to a PCP for annual routine health screenings and care.

Pharmacist Tobacco Cessation Therapy Act

Pharmacist Tobacco Cessation Therapy makes tobacco cessation

FEATURE

EXPANDING THE ROLE OF WEST VIRGINIA PHARMACISTS: STANDING ORDERS FOR ACCESSIBLE BIRTH CONTROL AND TOBACCO CESSATION

therapy and counseling more accessible to individuals who want to end their addiction to nicotine and tobacco products. It allows pharmacists to dispense tobacco cessation therapy and provide or arrange for cessation coaching under a Standing Order of the State Health Officer. Pharmacists providing this service must first complete a specialized training and register with the West Virginia Board of Pharmacy.

Patients seeking tobacco cessation services complete a patient intake assessment at the pharmacy and together with the pharmacists select a safe and appropriate cessation therapy product. Pharmacists also provide coaching/counseling, if they are a certified tobacco treatment specialist (CTTS), or referral to the West Virginia Tobacco Quitline and/or a local CTTS. Meds and counseling services will be billed to insurance as applicable.

Per the Standing Order, the tobacco cessation products that can be offered include over the counter nicotine replacement therapy (NRT) products such as patch, gum, inhaler, lozenge or nasal spray; Bupropion SR for oral administration; and Varenicline for oral administration.

When a tobacco cessation option is provided, the pharmacist will notify the patient's primary care provider (PCP). Patients are encouraged to follow-up with their healthcare provider. Additionally, the patient is referred to a PCP for annual routine health screenings and care.

INSIDE WVSMA

WVSMA NAMES NEW COMMUNICATIONS DIRECTOR, MEMBERSHIP ASSOCIATE

Editor's note:

This edition of the Journal will be the last publication edited by Dr. Tom Sporck and John Law.

The West Virginia State Medical Association (WVSMA) has promoted former Membership Director, Bethany Kinder, to Director of Communications and Managing Editor of the *West Virginia Medical Journal*.

Kinder replaces John Law, who started as the Kanawha Charleston Health Department's Chief of Staff on July 1, 2020.

Heather Nelson, previous Executive Assistant, will assume the new role of Membership Associate.

Bethany Kinder

Heather Nelson

WVU MEDICINE CHILDREN'S RANKS 37TH IN PEDIATRIC UROLOGY IN U.S. NEWS & WORLD REPORT 2020-21 BEST CHILDREN'S HOSPITALS

FEATURE

U.S. News & World Report, the global authority in hospital rankings and consumer advice, has ranked WVU Medicine Children's 37th in Pediatric Urology in the new 2020-21 Best Children's Hospitals rankings.

This year's ranking marks the third consecutive national ranking for Pediatric Urology at WVU Medicine Children's. The Adult Urology Program at WVU Medicine has been nationally ranked since 2017-18.

"It is my honor to lead a Department that not only ensures that West Virginians do not have to leave the state to receive the urologic care they need, but is also turned to by adults, families, and referring physicians from outside the state to solve complex urologic problems," Stanley Zaslau, M.D., chair of the WVU Department of Urology, said. "We are proud to be nationally recognized for our work and look forward to providing top-notch care to those who need us long into the future."

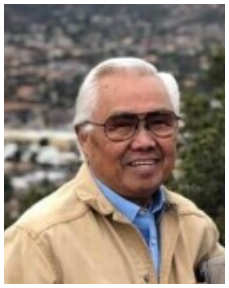
WVU Medicine Children's has the only comprehensive pediatric urology service with fellowship trained physicians in the state. The pediatric urologists at WVU Medicine Children's have special expertise in the management of all congenital anomalies of the genito-urinary system, kidney stones, neurogenic bladder, and dys-functional voiding. It is also the state's only pediatric urology practice offering robotic surgery.

Next year, WVU Medicine Children's will move into a 150-bed, nine-story hospital next to WVU Medicine J.W. Ruby Memorial Hospital. The state-of-the-art facility will provide expanded, dedicated pediatric care areas and will allow for the growth of pediatric specialty and subspecialty programs.

U.S. News introduced the Best Children's Hospitals rankings in 2007 to help families of children with rare or life-threatening illnesses find the best medical care available.

The rankings are the most comprehensive source of quality-related information on U.S. pediatric hospitals. For more information on WVU Medicine Children's, visit chidrens.wvumedicine.org.

Dr. Sporck Colleague Tribute



Constantino Y. Amores, MD, FACS, CIME,
West Virginia State Medical Association Past President

The West Virginia State Medical Journal is the bond that keeps us West Virginia physicians together. We have enjoyed the journal at its editorial best under Dr. Thom Spork's leadership, a heritage future editors will be measured by. Thank you, Dr. Spork, for your dedication and untiring services through the years.

SCIENTIFIC

INITIAL CLINICAL EXPERIENCE WITH PCSK9 INHIBITORS TO LOWER LDL CHOLESTEROL IN A UNIVERSITY LIPID CLINIC SETTING

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Conflicts of Interest:

None

Funding:

No additional funding was received for this study.

ABSTRACT

Proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors have demonstrated significant lowering of low-density lipoprotein (LDL) cholesterol in patients with atherosclerotic cardiovascular disease (ASCVD) and familial hypercholesterolemia (FH). We retrospectively reviewed data concerning use of PCSK9 inhibitors from patients in our university-based adult lipid clinic. Data collected included clinical pre-treatment variables and pre- and post-treatment non-fasting lipid profiles. Of 165 candidates, 163 were approved for PCSK9 inhibition (90% ASCVD and 10% FH). A majority of patients (72%) had statin intolerance. Treatment was provided and assessed in 141 patients. After three doses of medications, LDL cholesterol fell from 170 + 58 mg/dL to 76 + 45 mg/dL (55%, P<0.001). There were no differences in efficacy according to sex, elevated lipoprotein(a), and the PCSK9 inhibitor utilized. Continued efficacy was evaluated in 101 patients with LDL decreasing further from initial follow-up to long-term follow-up over an average of 14 months (74 ± 44 mg/dL to 68 ± 41 mg/dL). Permanent discontinuation of PCSK9 inhibitor because of side effects occurred in 11% of patients. When strict adherence to guidelines was applied, >95% approval rate was obtained, and there was similar efficacy in LDL lowering to what has been previously reported irrespective of statin intolerance.

INTRODUCTION

Following approval by the Food and Drug Administration in 2015, proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors have been available for clinical use in patients with atherosclerotic cardiovascular disease (ASCVD) and familial hypercholesterolemia (FH). They have demonstrated significant efficacy at reducing LDL cholesterol.[1,2] Three drugs have undergone randomized placebo controlled outcome evaluations with all drugs showing significant beneficial prognostic effects.[3-5] One drug, bococizumab,[4] initially demonstrated significant short-term benefit, but was not advanced to

market because of long-term efficacy and adverse events related to its immune stimulating properties (i.e., production of neutralizing antibodies). Utilizing intravascular ultrasound[6], evolocumab plus statin when compared to statin alone has been shown to reduce atheromatous plaque volume and produce a greater percentage of patients demonstrating plaque regression. While the use of PCSK9 inhibitors has been limited because of issues concerning prior authorization and cost, they have become part of clinical guidelines[7,8] for therapy in selected patients with hypercholesterolemia. The purpose of the present paper is to report our initial experience in acquiring and utilizing these medications in a university-based lipid clinic setting.

MATERIALS AND METHODS

Patient Population

Patients in this sample were all more than 18 years of age and were referred to our adult lipid clinic at the West Virginia University Heart and Vascular Institute. All patients had either ASCVD or FH without clinical ASCVD as qualifying diagnoses for PCSK9 inhibitor approval. Criteria used for PCSK9 inhibitor approval included:

- qualifying diagnosis
- documented record of lipid-lowering therapy
- current lipid levels on that therapy

All patients had unacceptably high LDL cholesterol levels on the maximum medical therapy they were able to tolerate, meaning their LDL cholesterol level was >70 mg/dL for ASCVD and >100 mg/dL for FH. Patients could be on moderate to high intensity statin therapy, tolerant of small statin doses, completely statin intolerant on 0mg of statin, on other non-statin therapy, or have some combination of these conditions.

All patients in this study were considered potential candidates for PCSK9 inhibition and were further characterized as to whether they were approved for this therapy, received the therapy, and had early as well as long-term efficacy assessments. PCSK9 inhibition included either evolocumab 140 mg or alirocumab 75 or 150 mg and was administered on a biweekly dosing interval. This study was approved by the institutional review board at our center, and a waiver of consent was granted.

LABORATORY TESTING

All patients had standard non-fasting lipid laboratory data before the administration of any PCSK9 inhibitor. An attempt was made to obtain standard non-fasting lipid data after at least three injections of therapy as well as in long-term follow-up. Standard lipid measurements were performed on ARCHITECT c-analyzers using ARCHITECT reagents (Abbott Diagnostics, Abbott Park, IL, USA) as previously reported.9 Lipoprotein(a) was measured in all patients, but over the course of the observation period, differing lipoprotein(a) measuring methods were used; because of lacking standardization, each method employed different reference intervals and/or clinical decision points. Because of methodologic and reporting differences, specific lipoprotein(a) concentrations are not included in this report. Lipoprotein(a) will be reported as "increased" or "not increased."

CALCULATIONS

Total cholesterol, triglycerides, and HDL cholesterol results were used to calculate non-HDL and LDL cholesterol levels. LDL cholesterol was measured directly. Non-HDL cholesterol was determined by calculating the difference between total cholesterol and HDL cholesterol. LDL cholesterol was calculated using the Friedewald equation:

LDL = TOTAL CHOLESTEROL – HDL CHOLESTEROL – (TRIGLYCERIDES/5).[10]

If serum triglycerides were greater than 400 mg/dL, the direct LDL measurement was utilized. When LDL cholesterol by the Friedewald equation was ≤ 40 mg/dL, then LDL was recalculated using the recently described Martin/Hopkins method.[10]

STATISTICS

Analyses were conducted using SPSS Statistics Version 24.0 (IBM Corp., Armonk, NY) A *P* value <0.05 was considered statistically significant. Continuous variables

INITIAL CLINICAL EXPERIENCE WITH PCSK9 INHIBITORS TO LOWER LDL CHOLESTEROL IN A UNIVERSITY LIPID CLINIC SETTING

were presented as mean ± standard deviation or median (interquartile range), and categorical variables were presented as frequency (percent). Paired samples *t*-tests were used to compare lipid measures before and after treatment and independent sample *t*-tests were used to compare change in lipid measures between patient groups (i.e., sex, statin intolerance, etc.). Given the presence of skewed data in some lipid measures, median values were illustrated in line graph form. Non-parametric test results were identical to parametric test results, so the mean values and parametric analysis results were reported.

RESULTS

Patient Population

Between September 2015 and August 2018, 165 patients were identified as candidates for PCSK9 inhibitors based upon:

- clinical qualifying diagnosis of either ASCVD or FH
- maximally tolerated oral lipid-lowering therapy
- present unacceptable level of LDL cholesterol on existing oral therapy

Prior authorization for approval to use PCSK9 inhibition was requested and was received for all but two patients (98.7% approval rate). One patient was denied because the only evidence of ASCVD was extensive coronary artery calcification. The other patient with CAD had unacceptable documentation of lipid-lowering therapy and failed to establish adequate documentation.

Of the 163 patients who received approval from their insurance providers (58% Medicare/Medicaid and 42% commercial), eight patients have not received treatment. One patient declined the treatment after approval. Two patients died prior to receiving treatment. Three patients had high copayments that could not be resolved by application to an outside funding source. Two patients are waiting to receive their medication. Of the remaining 155 patients who received drug therapy, 14 patients have not had follow-up lipids to assess their initial response. Eight of these patients have not received therapy long enough to be tested; one patient was lost to follow-up; one patient failed to obtain appropriate blood work, and four patients discontinued the drug because of unacceptable side effects.

When enrolling patients as candidates, we attempted to equally apply the two available products. As can be seen from Table 1, evolocumab was utilized more frequently than alirocumab with a ratio of approximately 2:1. This finding is directly linked to the preference of the insurance provider. Evolocumab was chosen by commercial insurance (77%) more often than by Medicare/Medicaid (54%).

At the time of this analysis, 141 patients had received three doses of drug and had obtained follow-up lipid profiles. Additionally, 101 of these patients had long-term follow-up lipid testing. One patient died on therapy. This patient was a 63-year-old woman with chronic coronary artery disease who had good initial and sustained responses to evolocumab achieving an LDL <30 mg/dL without obvious adverse events or side effects during the course of 28 months of treatment. Concurrent with the course of her evolocumab treatment, she developed small cell lung carcinoma, acute myeloblastic leukemia, and myelodysplastic syndrome and died as a result of complications of those disorders.

Of the 40 patients without long-term follow-up, most have not been on therapy long enough to require follow-up blood work. However, 13 discontinued the drug because of side effects. Two were lost to follow-up.

Clinical characteristics of the patients who were

approved for therapy, treated with follow-up, and treated with long-term follow-up are listed in Table 1. Evolocumab was the dominant PCSK9 inhibitor utilized. When alirocumab was utilized, the starting dose was often 75 mg with later up titration to the 150 mg dose depending upon the achieved LDL. When the starting LDL was more than 200 mg/dL, the 150 mg dose was usually chosen. Coronary atherosclerosis was the leading ASCVD diagnosis in this cohort. Of those with familial hypercholesterolemia, two had proven FH genotype by genetic testing and one had familial dysbetalipoproteinemia. The remaining patients were characterized as FH according to Dutch Lipid Clinic score and were approved for drug use on that basis. Approximately half of the patients had increased lipoprotein(a) concentrations at baseline.

Regarding patients with ASCVD, eight out of nine patients with coronary artery calcium present and without symptomatic or manifest ASCVD (i.e., myocardial infarction or stroke) received approval for PCSK9 inhibitors. All of these nine patients had statin intolerance and a strong family history of coronary disease in both parents or with an early presentation. Of the eight approved, four had Medicare and four had commercial insurance. The single patient denied had Medicare and applied for approval in early 2018. All of the other Medicare patients approved applied prior to 2018. Coronary calcium scores were variable in these nine asymptomatic patients. Five patients had quantitative coronary calcium scores.

Four patients had qualitative assessment from their chest CT scans. Of the latter group, one patient had minimal coronary calcification, and three had moderate calcification. Of those with quantitative coronary calcium scores, three had scores <100, one had a score of 254, and one had a score of 2428 (This is the patient who was denied). Only one of the eight patients approved for inhibitor therapy without symptomatic ASCVD had an initial denial that required an appeal. The patient ultimately denied failed on appeal despite a high coronary calcium score. The reason for denial given by the insurer was that coronary calcium as the sole criteria for ASCVD was not acceptable.

Concerning oral lipid lowering therapy utilized prior to PCSK9 inhibitor, a distinct majority (72%) were statin intolerant (Table 1). Approximately one-quarter of the patients were able to tolerate statins to some degree (28%), with approximately half of those able to tolerate a high intensity statin dose (14%). Approximately half of the patients were on some lipid-lowering therapy (52%), which included some combination of statin, ezetimibe, or bile acid sequestrant.

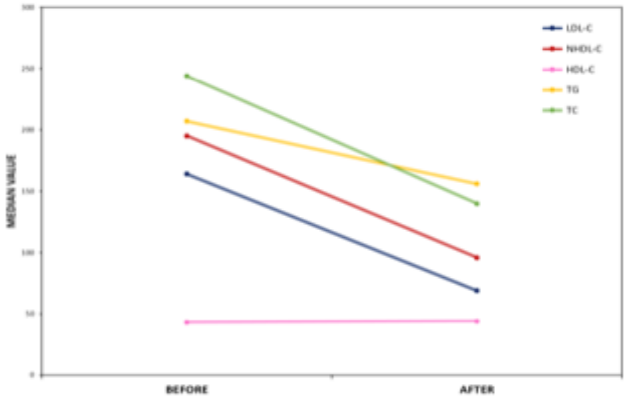

Figure 1. Change in median values of each cholesterol measure from before to after PCSK9 inhibitor treatment (*N* = 141). HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; NHDL-C, non-high density lipoprotein cholesterol; TC, total cholesterol; TG, triglycerides.

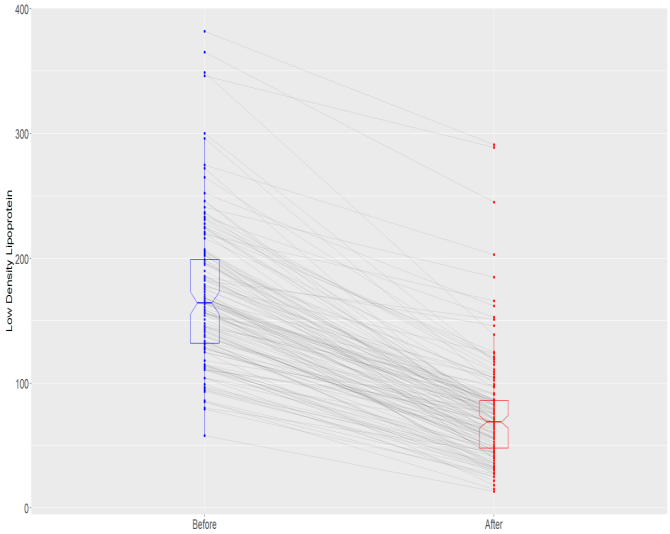

Figure 2. Change in LDL-C from before to after PCSK9 inhibitor treatment with the values for each patient illustrated separately and the median (IQR) demonstrated via box plots.

SCIENTIFIC

INITIAL CLINICAL EXPERIENCE WITH PCSK9 INHIBITORS TO LOWER LDL CHOLESTEROL IN A UNIVERSITY LIPID CLINIC SETTING

TABLE 1

Patient characteristics at baseline

	Approved	Treated	Long-term
	***N* = 163**	***N* = 141**	***N* = 101**
Age (years)	64.1 ± 11.4	63.8 ± 11.4	63.1 ± 11.0
Female	96 (59)	84 (60)	58 (57)
PCSK9 Inhibitor			
Evolocumab 140mg	104 (64)	94 (67)	71 (70)
Alirocumab 75mg	29 (18)	21 (15)	16 (16)
Alirocumab 150 mg	30 (18)	26 (18)	14 (14)
ASCVD	147 (90)	126 (89)	90 (89)
Coronary	124	109	79
Peripheral	4	3	0
Cerebral	4	2	0
Polyvascular	7	4	4
Coronary calcium	8	8	7
FH without ASCVD	16 (10)	15 (11)	11 (11)
Lipid diagnosis ASCVD			
Hypercholesterolemia alone	70 (48)	56 (44)	38 (42)
Combined hyperlipidemia	77 (52)	70 (56)	52 (58)
Elevated lipoprotein(a)	79 (49)	68 (48)	46 (46)
Therapy			
Statin intolerance	118 (72)	107 (76)	77 (76)
Any statin therapy	45 (28)	34 (24)	24 (24)
Any lipid-lowering therapy	84 (52)	69 (49)	49 (48)
High intensity statin	23 (14)	19 (13)	13 (13)

ASCVD, atherosclerotic cardiovascular disease; FH, familial hypercholesterolemia; PCSK9, proprotein convertase subtilisin kexin 9

Data presented as frequency (%) or mean ± SD

LIPID DATA

Summary baseline lipid data for patients approved for PCSK9 inhibitors (*N* = 163) are as follows:

- total cholesterol was 248.1 ± 71.1 mg/dL
- HDL cholesterol was 43.9 ± 11.2 mg/dL
- triglycerides were 239.6 ± 162.9 mg/dL
- non-HDL cholesterol was 204.8 ± 69.6 mg/dL
- LDL cholesterol was 165.5 ± 59.1 mg/dL

Table 2 shows the results for mean lipid values before and after treatment for the treated sample (*N* = 141), whereas Figure 1 shows the results for median lipid values and Figure 2 illustrates the results for each individual patient. All lipid measures decreased significantly after PCSK9 inhibition with the exception of HDL cholesterol, which increased significantly (Figure 1).

The statin intolerant group (*n* = 107) had similar changes in lipid measures compared to the statin tolerant group (*n* = 34), except that mean decrease in LDL was greater for the statin intolerant group (–98.1 vs –82.7, *P* = 0.035). No differences in lipid measure changes were found for comparisons by sex, PCSK9 inhibitor, or baseline lipoprotein(a). The lipid results for the follow-up sample (*N* = 101) revealed LDL decreased significantly from baseline to initial follow-up (–98.2; *P* < 0.001) and from baseline to latest follow-up (–103.8; *P* < 0.001). In these patients, LDL decreased significantly between initial follow-up and long-term follow-up (73.8 ± 43.5 mg/dL vs 68.1 ± 40.5 mg/dL, *P* = 0.022) after a mean of 14.0 ± 8.4 months of treatment.

Achievement of LDL goals was assessed using a greater than 50% reduction in LDL as well as achieving a specific cut-point of 70 mg/dL for ASCVD and 100 mg/dL for FH. Both of these goals are suggested by the latest guidelines.[8] For the 141 patients who received treatment, 70% achieved >50% reduction in LDL and 55% achieved their specific cut-point goal. Those with statin intolerance achieved their specific cut-point goal 50% of the time (54/107). For the 101 patients who had long-term evaluations, 79% achieved >50% reduction in LDL at latest follow-up and 63% achieved their specific cut-point goal. Statin intolerant patients achieved their goal 57% of the time (44/77) at long-term follow-up.

MEDICATION DISCONTINUATION

Of the 155 patients who received drug therapy, 24 patients discontinued the medication at some point with three patients continuing with the other available PCSK9 inhibitor after re-challenge (Table 3). Five patients discontinued therapy early, i.e., after the first 1-2 doses and never considered re-challenge of the same medication or a trial of the other available PCSK9 inhibitor. Fifteen of the remaining 19 patients discontinued therapy later, i.e., after their initial follow-up evaluation, and never considered re-challenge of the same medication or a trial of the other available PCSK9 inhibitor. Four patients of the 19 underwent a trial of the other available PCSK9 inhibitor. One patient could not tolerate the other product and discontinued because of flu-like symptoms and sinus infections. The other three patients have continued on their therapy without side effects thus far.

All of the side effects we observed were also seen in the randomized trials for these medications except for DVT. In this particular patient, there was no clearly established link between the DVT and the PCSK9 inhibitor. The DVT resolved while the patient was still on therapy, but the patient preferred to discontinue the PCSK9 inhibitor. Minor flu-like symptoms were seen in 15 other patients (10%), but these were well-tolerated, of short duration, and frequently disappeared despite continued PCSK9 inhibitor therapy. A few injection site reactions (n = 5) were noted, but these were easily managed. In no patient did these reactions lead to discontinuation. Overall, of 155 patients who received medication, 117 (75%) experienced no side effects.

DISCUSSION

This report summarizes our experience with the first 165 patients we considered to be candidates for PCSK9 inhibition.

INITIAL CLINICAL EXPERIENCE WITH PCSK9 INHIBITORS TO LOWER LDL CHOLESTEROL IN A UNIVERSITY LIPID CLINIC SETTING

TABLE 2

Lipid levels before and after treatment (N = 141)

	Pre-treatment	Post-treatment	% Change	*P* value
Total cholesterol	253.3 ± 69.6	149.0 ± 53.2	–41%	<0.001
HDLc	44.2 ± 11.5	45.7 ± 12.1	3%	0.017
NonHDLc	209.8 ± 67.9	103.6 ± 50.9	–51%	<0.001
Triglycerides	244.3 ± 154.9	184.4 ± 96.6	–25%	<0.001
LDLc	170.2 ± 57.6	75.8 ± 45.1	–55%	<0.001

HDLC, high density lipoprotein cholesterol; NonHDLc, non-HDL cholesterol; LDLc, low density lipoprotein cholesterol

Patients were considered candidates on the basis of the three criteria:

- established diagnosis of either ASCVD or FH
- trial of at least two high- intensity statins with or without intolerance
- level of LDL cholesterol that was higher than desired based upon the disease present and the tolerated therapy.

Prior studies have outlined procedures for inclusion using these criteria.[11,12] However, despite these published criteria, approval rates for PCSK9 inhibition therapy applications have been low.[13]

We believe our high rate of approval is attributed to our specialty clinic, where an intensive effort is made to establish the three criteria above prior to considering application. Once a prescription is written, we have a specialty pharmacy available that assists in processing the application, thereby relieving the provider and their support staff from having to perform this task. Any denials were addressed with a quick and detailed response that addressed each point forming the basis of the denial. Occasionally, a peer-to-peer review process is necessary.

In many instances, approval for PCSK9 inhibitor therapy comes with an unacceptably high co-payment, especially for Medicare patients. Conversely, patients with commercial insurance are usually covered by a co-pay card provided by the pharmaceutical company. Medicare patients are encouraged to apply for financial assistance through organizations affiliated with the pharmaceutical company. Some patients, who do not qualify for financial assistance, end up not receiving medication if they are unable or unwilling to meet the copayment.

In our study, only a small number of patients failed to receive approval for the PCSK9 inhibitor. The most surprising denial was associated with a Medicare patient who had a very high coronary calcium score, statin intolerance, and strong family history of coronary disease. We had previous Medicare patients with coronary calcium as their only manifestation of ASCVD who were approved. In addition, after closing the dataset for this analysis, we have had an additional Medicare patient in 2018 approved with only a high coronary calcium score. It would appear that Medicare approval criteria differ

according to their respective supplemental Part D insurance.

Our lipid results are in keeping with what is reported in randomized clinical trials.3,5 All potentially atherogenic lipoprotein particles were reduced significantly. In addition, we have previously shown that remnant cholesterol is also reduced by PCSK9 inhibitors, especially in patients with elevated triglycerides.9 Remnant cholesterol would be the cholesterol remaining after subtraction of LDL from non-HDL cholesterol. In the current study, the reduction in LDL continued from initial to long-term follow-up assessment over an average of 14 months following initiation of therapy. Nearly 80% of patients on long-term therapy had at least a 50% reduction in LDL compared to their baseline. More than 55% of patients treated achieved their LDL goal.

All of the randomized outcome trials to date studied populations where the patients were able to tolerate moderate to high intensity statins.3-5 The majority of patients in this study were statin intolerant, but the PCSK9 inhibitor therapy was equally effective if not more effective for LDL reduction in those patients compared with the statin tolerant patients. In addition, no difference in LDL response was seen in patients according to sex, lipoprotein(a) elevation, or PCSK9 inhibitor used. Lastly, we observed side effects that led to discontinuation in approximately 11% of our cohort. Several patients with side effects to one inhibitor were willing to try the other PCSK9 inhibitor with success.

We limited our evaluation of lipid parameters to non-fasting specimens, principally for the sake of patient convenience. When compared to fasting lipids, non-fasting lipids are similar with the exception of triglycerides. The degree of the effect is not as great as previously thought.14 When triglycerides concentrations were more than 400 mg/dL, we used direct LDL measurements. The use of non-fasting lipid bloodwork is endorsed by numerous societies, guidelines, and statements including the American Heart Association, the European Society of Cardiology, and the American Association of Clinical Endocrinology.8,14.

CONCLUSIONS

In this initial experience with a real-world population receiving PCSK9 inhibition for approved indications and using non-fasting lipid measurements, there was a significant reduction in LDL cholesterol in both men and women that was maintained over time with a relatively low frequency of side effects that prompted discontinuation of the therapy. Unlike previous randomized trials, our population had a high prevalence of statin intolerance. The LDL reduction in those patients was at least as good if not better than the statin tolerant patients. Insurance approvals for PCSK9 inhibitors are challenging, but we were successful due to strict adherence to utilization criteria and use of a specialty pharmacy.

TABLE 3

Permanent discontinuation of medication (*n* = 21)

	Early	Late
Myalgias	2	6
Diarrhea	1	1
Back pain	1	0
Rash	0	2
Dizziness	0	1
Deep vein thrombosis	0	1
Flu-like symptoms	0	1
Lost-to-follow-up	1	2
Insurance issues	0	1
Death	0	1

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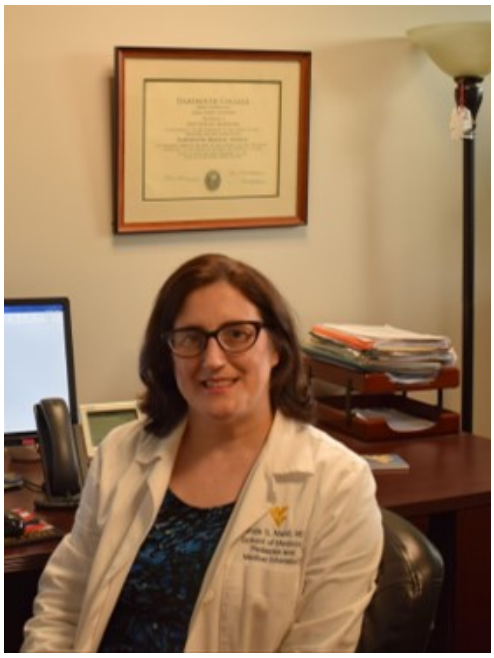
MEET DR. LINDA NIELD

INSIDE WVSMA

West Virginia Medical Journal's New Editor

Linda S. Nield, MD is a Professor of Medical Education and Pediatrics at West Virginia University (WVU) School of Medicine in Morgantown, West Virginia. She is the Associate Dean for Admissions for the MD degree and the Co-Director of the Pediatrics Residency Rural Scholars Program at WVU. Dr. Nield has been on faculty at WVU School of Medicine since 1993 after completion of her residency there.



A native of Rhode Island, she is a 1986 graduate of the College of the Holy Cross in Worcester, Massachusetts and a 1990 graduate of Dartmouth Medical School in Hanover, New Hampshire. Dr. Nield was the Pediatrics Residency Program Director at WVU from 2010-2015; in that role she provided leadership to the Department, as she was overseer of the residency recruitment process, educational curriculum and clinical experiences. She has served as the Chair of multiple departmental and graduate medical education (GME) committees, including the Promotion and Tenure Committee for the Department of Medical Education and the GME Health Care Disparities Committee. She is currently a member of the WVU School of Medicine's Diversity Committee, MD/PhD Selection Committee and the Curriculum Committee. She also has the role of Curriculum Thread Director for Diversity, Inclusion and Health Care Disparities, and she ensures these important topics are "threaded" throughout the four-year medical school curriculum.

On the state level, Dr. Nield is the Chair of the Medical Student and Resident Section of the WV Chapter of the American Academy of Pediatrics (WVAAP), and Chair of the WVAAP Spring Meeting Planning Committee. On the national level, she has been an active reviewer for the Association of American Medical College (AAMC) *MedEDPortal,* AAMC national annual conventions and numerous medical journals. She has three decades of experience with mentoring medical students and residents, especially with career planning, board preparation and the process of writing for the clinical literature. She is the author of several medical articles which are indexed on PubMed and has written several book chapters in medical text books. She is the lead author of the *Residency Program Director's Handbook, Third Edtion*, which is a resource for new residency program directors.

Dr. Nield is a member of Alpha Omega Alpha Honor Medical Society, a past recipient of the David Z. Morgan Mentor Award and the WVU Health Science Center Women in Science and Health Advanced Career Excellence Award, and she was named West Virginia's Pediatrician of the Year in 2017. In 2020, she assumed the position of the Editor of the *West Virginia Medical Journal*, the journal of the West Virginia State Medical Association. She is married to Tim Nield (a native of Keyser, WV) and she has two children, Olivia and Timothy.

FEATURE

AMA DELEGATE REPORT

***Joseph B. Selby**, MD, Delegate and Chair*

For the first time in history, the annual meeting of the AMA, House of Delegate held in June in Chicago every year was convened on a virtual platform. The purpose of the meeting as defined by the request of the Board of Trustees was to inaugurate the new President, to elect Officers and Members of Councils, and conduct essential business that normally would be addressed at a face-to-face annual meeting of the House of Delegates.

Essential business was determined by review of the bylaws. The meeting lasted just over three hours and included thirteen agenda items:

1. Call to order
2. Invocation and National Anthem
3. Report of the Committee on Rules and Credentials
4. Remarks of the Speaker
5. Address of the AMA President
6. Nominations of Officers and Councils. Nomination of new Member of Council on Ethical and Judicial Affairs (CEJA)
7. Board and Council Elections
8. Presentation, Correction and Adoption of the Minutes of the 2019 Interim Meeting
9. Nominations for Distinguished Service Award
10. Report of Reference Committees (Governance and Finance) and Constitution and Bylaws
11. AMA Presidential Inauguration and Address
12. Closing remarks/unfinished business
13. Final Report of the Committee on Rules and Credentials

For several days prior to the Virtual Annual Meeting your two Delegates, Dr. Hoyt Burdick and myself participated in meetings and interviews with the Southeast Delegation of which West Virginia is a member. There were two contested elections. I participated in interviews for the two vacancies on the Council on Medical Service and Dr. Burdick covered the interviews for the four vacancies on the Board of Trustees. As is sometimes the case when a new member to a Board or Council is elected he or she vacates a seat on another Board of Council. This year was no exception and it was challenging to deal with "Pop-up" candidates nominated from the floor using a virtual platform. However, it was accomplished.

Voting was possible via smartphone, tablet, laptops and computers. Delegates were provided with a secure delegate code and a password. Election results were available immediately..

Elected to the Council on Medical Service:

- Lynn Jeffers, MD, MBA
- Erick Eiting, MD, MPH, MMM
- Steven Chen, MD, MBA

Elected to the Board of Trustees:

- David Aizuss, MD
- Willarda Edwards, MD, MBA
- Ilse Levin, DO, MPH
- Thomas Madejski, MD

Dr. Gerald E. Harmon, MD, a South Carolina family physician won the Office of President elect by acclamation during the 2020 AMA virtual meeting of the AMA House

of Delegates. Complete election results can be found on the AMA website ama-assn.org/house-delegates/ama-elections.

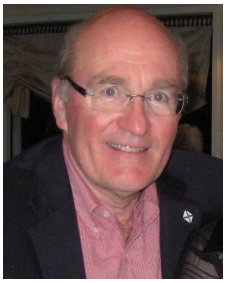
Dr. Patrice A. Harris, a WVU graduate and West Virginia native gave an inspiring farewell address as the outgoing President of the AMA. Dr. Harris was faced with many challenges this past year and did so with intelligence, grace and humility, thank you Dr. Harris for your service. The incoming AMA President is Dr. Susan R. Bailey from Fort Worth, Texas. She is the former Speaker of the House of Delegates and I am confident she will be an excellent spokesperson for American Medicine.

I must say it was odd not attending reference committee hearings, not listening to the opinions form across America and not voting on resolutions as they came before the floor of House of Delegates.

The stage is set for a very busy meeting in San Diego in November 2020 provided it is safe to gather in large numbers in close proximity. I am sure the virtual platform will take on a larger and larger role to facilitate large meetings just as is accruing in daily medical practice.

Dr. Sporck Colleague Tribute

Michael Fidler, MD



Tom has been an active and contributing member of the West Virginia State Medical Association throughout his professional career and continuing to this day. He had a distinguished career as an otolaryngologist in Charleston. For the past 20 years, Tom has dedicated himself to assuring publication of the highest quality peer-reviewed scientific articles as the lead editor of the *West Virginia State Medical Journal.* In that effort, he has recruited a distinguished cadre of assistant editors and dedicated staff to help him accomplish this task. On his retirement as editor, all of us will agree that, under Tom's stewardship, the *Journal* has become an ever more important resource for timely medical and practice-related information for its readers. He is leaving big shoes to fill.

FEATURE

COVID-19 SPARKS VIRTUAL CELEBRATIONS, EVENTS AT MARSHALL SCHOOL OF MEDICINE

As a result of the 2019 novel coronavirus (COVID-19) pandemic and social distancing requirements, the Marshall University Joan C. Edwards School of Medicine celebrated its 40th annual graduation and investiture with a virtual ceremony Friday, May 1, streamed live on Facebook, YouTube and Livesteam.

Marshall University President Jerome A. Gilbert, Ph.D., conferred 77 Doctor of Medicine and two Doctor of Philosophy in Biomedical Research degrees during the virtual ceremony. Additionally, retired professor and obstetrician-gynecologist Bruce A. Ratcliff, M.D., was recognized by the School of Medicine Alumni Association as this year's honorary alumnus.

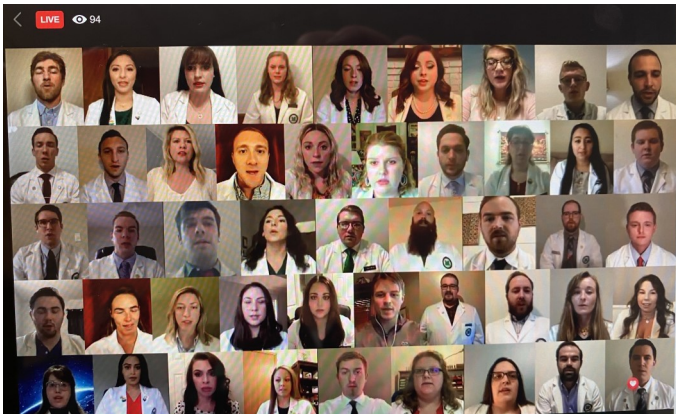
The keynote address was provided by Maurice A. Mufson, M.D., professor of medicine and chair emeritus in the Department of Medicine. Class President Preeya T. Shah, M.D., M.S., of Hurricane, West Virginia, addressed the graduates as the class speaker, and Dakota T. May, M.D., of Delbarton, West Virginia, led the class in reciting the Oath of Hippocrates.

> "Despite a nontraditional format, it was incredibly rewarding to participate in this year's commencement ceremony," said Joseph I. Shapiro, M.D., dean of the School of Medicine. "This is a terrific class that's going on to do great things in their careers."

The School of Medicine also gifted celebration gift boxes, complete with diplomas, to every member of the graduating class.

The Class of 2020, who were also unable to celebrate Match Day together, matched to residencies located from Boston, Massachusetts, to Seattle, Washington.

Twenty-one graduates will remain in West Virginia with more than a dozen completing residencies at Marshall. Half of the graduates matched to primary care residencies, and the other residencies span 15 specialties.



Doctor of Medicine graduates from the Class of 2020 recited the Oath of Hippocrates together virtually.

Pipeline programs transition online

The Marshall School of Medicine transitioned all of its residential pipeline programs online for summer 2020 in response to social distancing requirements. On June 8, the School hosted 30 students from nine colleges and universities for its Virtual Summer Academy. Twenty-three high school students from West Virginia, Kentucky and Ohio participated in the four-week long Health Care Pathways Initiative June 8-July 3. Additionally, 10 undergraduate ethnic minority students virtually participated in Project PREMED on July 23 and 24.

New academic year ushers in new fellowship programs

On July 1, 100 incoming resident physicians and fellows began the next phase of their training at the Marshall University Joan C. Edwards School of Medicine. This includes fellows in six new programs—addiction medicine, child and adolescent psychiatry, geriatric medicine, geriatric psychiatry, pediatric hospital medicine and pulmonary/critical care.

"These are areas of specialty care that are of particular importance here in West Virginia," said Paulette S. Wehner, M.D., vice dean of graduate medical education at the Marshall School of Medicine. "Several of these advanced training programs are the first of their kind in the state, and we know that where a physician trains has a direct impact on where he or she chooses to practice. It becomes a win-win for everyone when patients, young and old, don't have to travel out of state to receive the care they need."

The Department of Family and Community Health houses addiction medicine, a subspecialty available to physicians who have completed a residency in family medicine.

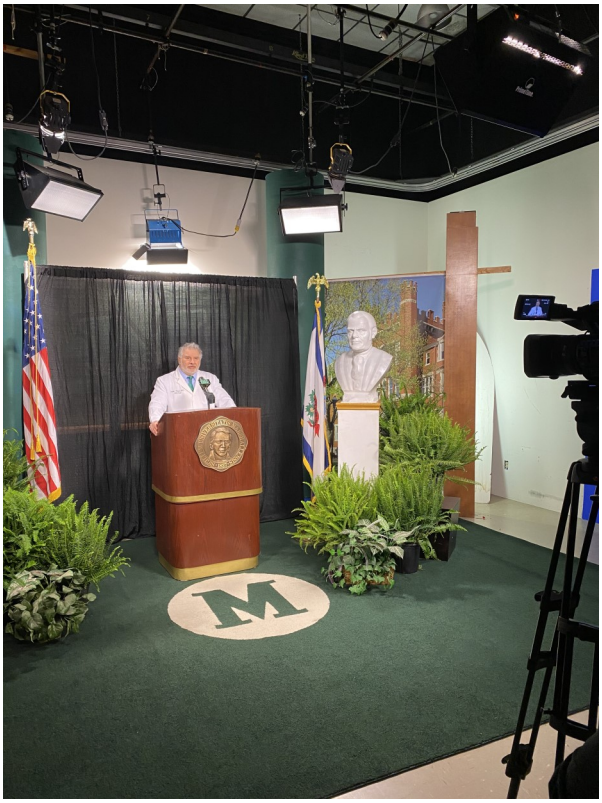
Marshall's addiction medicine fellowship, led by James B. Becker, M.D., focuses on both abstinence-based and medication-assisted treatment in community-based outpatient, residential treatment and hospital-based inpatient consultation settings. The department is also home to the geriatric medicine fellowship, which emphasizes caring for rural elders under the direction of Robert B. Walker, M.D. Physicians trained in the geriatric subspecialty provide primary care for older adults as well as inpatient, home health, transitional and palliative care.

In collaboration with Hoops Family Children's Hospital at Cabell Huntington Hospital under the direction of Susan L. Flesher, M.D., FAAP, the two-year pediatric hospital medicine fellowship program focuses on developing physicians who take a lead role in caring for pediatric patients in a hospital setting. The curriculum provides in-depth education and experiences in procedural sedation, quality improvement science, clinical and translational research, medical education and child advocacy.

Within the Department of Psychiatry and Behavioral Medicine comes the child and adolescent psychiatry fellowship under the direction of Kelly E. Melvin, M.D. Trainees learn to recognize and treat a rich variety of psychopathology as they rotate through inpatient and outpatient settings with children of all ages and stages of development. Led by Suzanne Holroyd, M.D., the geriatric psychiatry fellowship includes a one-year training experience in inpatient service, the outpatient clinic setting, long-term/nursing home care, consult service and research.

Finally, under the direction of Yousef Shweihat, M.D., the adult pulmonary/critical care fellowship is a three-year program that provides extensive experience in a variety of procedures, including bronchoscopy, endobronchial ultrasound, intubation, pulmonary function interpretation and more, as well as sleep study interpretation and interventional pulmonology procedures. It is housed within the Department of Medicine and evolved from the pulmonary medicine fellowship supervised for many years by Nancy Munn, M.D.

Marshall provides advanced training to a total of 236 resident physicians and fellows in 22 areas of care.



Joseph I. Shapiro, M.D., dean, during the school's virtual graduation ceremony.

From your WVSMA staff, thank you, Dr. Sporck, for your years of service to the *West Virginia Medical Journal!*

FEATURE

WVSOM MAKES ADJUSTMENTS DURING COVID-19 PANDEMIC

Nearly overnight, the West Virginia School of Osteopathic Medicine (WVSOM) had to make adjustments in the way it delivered curriculum to students and evaluated employees working from home. Safeguards had to be established to keep the campus in Lewisburg, West Virginia clean due to the COVID-19 pandemic. WVSOM introduced a detailed plan that allowed first and second-year medical students to begin the new school year and employees to return to campus.

WVSOM switched from on-campus to remote learning at the end of March, after spring break. WVSOM's media services and information technology departments worked to livestream lectures and provide calendar invitations for each lecture so students could easily "attend" live classes using their school-issued laptops. Approval for the change was sought and obtained from the Higher Learning Commission.

WVSOM 3-D Mask Assembly

Before returning to campus on July 15, WVSOM employees prepared for students' returning by hand-sewing masks to be distributed to all WVSOM students, employees and staff at the Robert C. Byrd Clinic. More than 1,200 hand-sewn masks were made.

WVSOM, the Greenbrier County Health Department, the Greenbrier County Board of Education and other local agencies partnered on the 3-D production of masks, modeled after N95 masks, to aid in the supply of personal protective equipment. A total of 1,414 N95 masks and 44 face shields were donated to the county health department for health care workers.

Students were asked to return to the Lewisburg community in July to isolate before orientation began. Students participated in drive-through COVID-19 testing stations the week of July 20, where they received personal protective equipment, including an N95 mask, a cloth mask, and a face shield to be used in anatomy lab. First-year students also received their school-issued computers.

Drive-Through Testing at WVSOM

Roy Russ, Ph.D., WVSOM's associate dean for preclinical education, said COVID-19 test results allow administrators to identify any positive cases and enforce a quarantine, conduct contact tracing to ensure the safety of others and retest. Only students who produced a negative test were allowed on campus. Russ said, "Besides trying to protect members of our community, we also have volunteer retired faculty who are more vulnerable and employees who are more susceptible to the virus. We want to protect everybody."

The school has made significant changes to the environment in which students will participate in osteopathic principles and practice labs, where hands-on training is a necessary component of osteopathic medical education. The school's Conference Center has been divided into sections to accommodate small groups, or "pods," of no more than 22 students each. Each pod of students will participate in labs together — including clinical skills and anatomy — to limit unnecessary interaction and potential virus spread. While labs must be conducted in person, faculty will continue to deliver lectures by livestreaming and then archiving content.

Craig Boisvert, D.O., WVSOM's vice president for academic

affairs and dean, oversees the school's COVID-19 task force, which is made up of six administrators and faculty members.

He said he is confident that the plan ensures the greatest protection in preventing the spread of the coronavirus.

"WVSOM considered many different factors in how to bring our students back to Lewisburg to start a new school year in the safest way possible, while also keeping in mind safeguards for our employees and members of the community. We feel like we have taken the necessary steps to do our part in limiting the spread of the virus," he said. "Most students understand that these are unusual circumstances, and while the school year might be different from what they expected, they are more than willing to follow our recommendations for the safety of all."

Maintaining safety, keeping medical students on track to graduate, keeping employees working, and considering what can be done for the community during the pandemic, have been the key concerns for WVSOM President James W. Nemitz, Ph.D., throughout the pandemic. "The safety of our community and our students is of paramount importance," Nemitz said. "We are doing everything we can at WVSOM to keep individuals safe during this pandemic."

Delivering content to students is the most critical responsibility of any medical school. WVSOM is no exception, and although the school's mission goes beyond educating tomorrow's physicians, priorities continue to shift to ensure that students receive the quality osteopathic medical education for which WVSOM is renowned, even in the midst of a pandemic. WVSOM strives to prepare its students to be frontline workers and to enter the health care profession as proud alumni.

Feed More in 24

WVSOM, the school's Center for Rural and Community Health (CRCH), the WVSOM Foundation and the WVSOM Alumni Association partnered in the "Feed More in 24" challenge, which called on participants to walk or run within their communities, find sponsors and donate the funds to a food charity of their choice. With his own 100-mile run, student Vincent Morra raised $8,070 for Feeding Seniors/Saving Businesses, a Greenbrier County-based program that provides meals to seniors, disabled and immunosuppressed individuals while supporting local businesses. In June, the WVSOM Foundation and CRCH presented a donation matching $5,000 of that amount, for a total of $13,070 going to the program.

Feed More in 24 Fundraiser

152nd Healthcare Summit Announcement

After careful consideration and thoughtful deliberation inclusive of recommendations from the Scientific Education Sessions Committee and the Executive Committee, we have cancelled this year's Healthcare Summit as a result of these unprecedented times we face navigating the COVID-19 pandemic.

We hope you'll join us at the Greenbrier in 2021!

West Virginia State Medical Association

FEATURE

TO HELP WEST VIRGINIA REOPEN SAFELY, WVU RESEARCHERS DEVELOP NEW COVID-19 TESTS

COVID-19 tests are in short supply. The companies that make the necessary chemicals—called reagents—can't keep up with demand. But researchers at West Virginia University are developing new tests on their own to identify who has COVID-19 now and who had it in the past but recovered.

"To get enough reagents to run thousands of tests of samples is a big problem—not only at WVU, not only in West Virginia and not only in the United States but around the world," said Ivan Martinez, an associate professor in the WVU Cancer Institute and School of Medicine. "When you don't have enough resources, you have to be creative. How can we develop something in house—here at WVU—so we don't have to depend on these companies?"

Processing numerous COVID-19 tests at once will be critical for testing large segments of the West Virginia population or students returning to WVU for the fall semester.

"We hope that our work will help the state and WVU reopen quickly and safely for business," said Peter Stoilov, an associate professor of biochemistry.

Taking apart the Legos

Martinez and Stoilov are pursuing a new diagnostic test that can recognize the novel coronavirus in a nose-swab sample.

The test works by detecting the RNA of SARS-CoV-2, the virus that causes COVID-19. RNA—a single strand of nucleic acid—contains all of the genetic instructions needed to create a SARS-CoV-2 virus. In humans, DNA—with its familiar double-helix molecular structure—does the job.

Only people currently infected with COVID-19 would test positive for SARS-CoV-2 RNA. Everyone else would test negative, including people who are infected with a different coronavirus that might cause the common cold, for example.

It is important for the test to be as sensitive as possible. There is always a chance that the amount of virus will be too low to detect. Having a sensitive test reduces the likelihood that the viral RNA will be "overlooked" and a patient misidentified as negative for COVID-19 when—in actuality—they're infected and could transmit the disease to other people.

"This is something very important that everyone getting tested should understand: we can be certain that a positive test is positive, but we can never say with absolute certainty that a negative test is negative," Stoilov said. "All we can say is that there was not enough of the virus for the test to detect it. It could be that there was no virus at all, but it is also possible that there two few viral particles for the test to produce a signal."

The test that Stoilov, Martinez and their team are developing can sense miniscule amounts of RNA in a sample. It does this by amplifying even tiny amounts of SARS-CoV-2 RNA.

"Imagine that the virus is assembled out of Legos," said Martinez, who teaches in the Department of Microbiology, Immunology and Cell Biology. "We put in this chemical—lysis buffer—and it disassembles the Legos. That way we can expose the RNA genome of the virus. Then, we use very small magnetic beads that will bind to the RNA so we can separate it from the rest of the Legos by using a bigger magnet. After that, we use special pieces of DNA, called primers, that bind to a region of that RNA. Then we use two enzymes: one that copies the RNA genome of the virus to DNA, and another enzyme that copies this little piece of DNA multiple times."

As the DNA fragments replicate exponentially—two becoming four, four becoming 16, 16 becoming 256—they make a fluorescence sensor that the scientists use shine brighter and brighter.

"After all of the cycles that you do with this enzyme—after 30 to 40 cycles—now you have trillions of copies of DNA," Martinez said. "And these trillions of copies give you trillions of signals. That's why this test is so sensitive."

Just how sensitive is it? Once someone's nose has been swabbed for the novel coronavirus, the swab is placed in a viral transport medium—a milliliter of liquid—before it's sent to a lab and tested. With WVU's test, as few as 75 copies of RNA that washed away from the swab are enough to trigger a positive result if the virus is present.

"To give you an example, the test initially used by the CDC had a limit of detection over 1,000 copies per

milliliter," said Peter Perrotta, a professor and chair of the Department of Pathology, Anatomy and Laboratory Medicine and part of the test-development team. "The test developed by Drs. Martinez and Stoilov is more sensitive than many tests that are currently used in this country."

The test's accuracy isn't its only advantage. So are the number of samples it can process at a time.

"We are now working to fully automate the COVID-19 test and establish it in the clinical lab so that we can start testing large number of samples," Stoilov said. "The timeline for placing the test in production depends on when the funding will become available and how quickly the vendors can deliver the equipment. In the meantime, we are testing a procedure to pool samples without losing sensitivity. Such sample pooling will allow us to increase the number of tests we can do in a day by at least tenfold."

He added that work carried out by the Centers for Disease Control and Prevention—and by the scientists behind Bio-On-Magnetic-Beads—was essential to the quick test development and he, Martinez and their colleagues achieved.

"We had free access to data on coronaviruses gathered by scientists from around the world, and especially China, because our colleagues put together equipment and supplies to get us going and because the Health Sciences Center's research office supported our effort," he said. "To put it concisely: we succeeded because we stood on the shoulders of giants. It would have taken us more than a year if we had to do everything from scratch, and this is a very, very optimistic estimate."

From antibody testing to vaccination

As crucial as diagnostic testing is for identifying current COVID-19 infections, it can't tell you who had the virus weeks or months ago and has since gotten over it. It's a snapshot of the present, not archival footage of the past.

That's the purpose of antibody testing. Antibodies are proteins produced by immune cells that the body generates in response to a virus, bacterium or other

COVID-19 testing

cell that it flags as an invader. Like a key fitting into a lock, the antibodies bind proteins on the surface of invading cells—called antigens—to prevent the pathogen from infiltrating healthy cells and making us sick.

"It became very clear that we needed to be able to measure antibodies that recognize SARS-CoV-2 in order to better understand the pandemic as well as facilitate vaccine development efforts," said Heath Damron, an assistant professor in the Department of Microbiology, Immunology and Cell Biology and the director of the Vaccine Development Center. He is leading WVU's effort to develop a SARS-CoV-2 antibody test. Alex Horspool, a postdoctoral fellow, has developed the test and validated it with hundreds of patient samples.

"Responses to vaccines will be different depending on if someone has been exposed to the virus or not," Damron said. "We also wanted to have a test that we were capable of producing the proteins for in house, so we would be less affected by supply chain issues."

Another benefit of the test is its cost-effectiveness. Damron and his colleagues are working to automate their test with robotics, so they will be able to test more samples faster, at a lower cost.

"In many of the research projects being proposed, we expect in the thousands of samples to be able to survey the populations of interest," he said.

Whereas the diagnostic test relies on samples collected on nose swabs, the antibody test uses serum extracted from blood samples. It seeks out specific antibodies that recognize the SARS-CoV-2 "spike" protein. These antibodies are important not only for antibody testing but also for developing an eventual COVID-19 vaccine.

"Almost all vaccines in development target the spike protein because it is what enables the virus to bind the ACE2 receptor and infect the target cell," Damron said. "If a vaccine induces antibodies that bind to the spike and block its ability to engage the ACE2 receptor, then infection can be blocked."

The antibody test doesn't just show whether antibodies are present. It also shows how high the concentration of antibodies is. It's more like a dimmer switch than a standard, on/off light switch.

"It is likely that people with more severe infections will produce more antibodies," Damron said. "However, a lot more work is needed at this time. It is also not clear if people will be protected from being infected. We have so much to understand about this virus."

The antibody test that Damron and his colleagues are developing complements a commercial platform that WVU Medicine already uses to determine if a different SARS-CoV-2 antibody is present in blood plasma samples.

The researchers will soon send their new in-house test to the Food and Drug Administration for approval. In the meantime, they are using it for preclinical vaccine studies and other COVID-19 research projects.

"The teamwork that I have seen as so many individuals have contributed their unique talents during these past several weeks has highlighted the strength of WVU and our state," said Laura Gibson, HSC's senior associate vice president for research and graduate education, and the School of Medicine's associate dean for research. "Nobody is worried about who gets 'credit' moving forward. Everyone is entirely focused on being part of solving problems that need immediate action and thoughtful long-term strategies. Applying foundational science to solving real problems is why we are here as a scientific community—in it together."


THANK YOU FOR ALL THAT YOU DO TO KEEP YOUR PATIENTS, OUR COMMUNITIES AND OUR COUNTRY SAFE.
You are on the front lines of providing care to your patients; supporting communities; and focusing on how to keep yourself and your loved ones safe.
Healthcare truly is a team sport, one that requires a large and diverse roster of players with a variety of unique backgrounds, experiences and expertise.
Doctors, who would be the first to say they could not do it alone, are joined by a broader team on the field; together that team carries the full weight of caring for our patients.
Today — and every day — we thank you.
coronavirus.wvu.edu
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SCHOOL OF MEDICINE
MOUNTAINEERS GO FIRST.

TELEHEALTH IN WEST VIRGINIA DURING COVID

FEATURE

Amy Post and Valarie Blake

Telehealth has always been important in states like West Virginia that have large rural populations and limited healthcare resources. But telehealth has proven even more critical to the health of West Virginians during the COVID-19 pandemic. Telehealth enables providers to maintain continuity of care and minimize or avoid the negative consequences for patients from delayed preventive, chronic, or routine care during periods of lockdown and mandatory social distancing. For providers who are thinking of engaging in telehealth with their patients during the pandemic, we provide an overview of some key regulatory issues you should be aware of.

First, it is important to note that all telehealth care in West Virginia is subject to the same standards of care, professional practice requirements, and scope of practice limitations as traditional in-person physician-patient encounters. These standards apply to all qualified licensed professionals providing health care services, including physicians, osteopathic physicians, surgeons, and psychologists. Notwithstanding a few very narrow exceptions, Schedule II controlled substances may not be prescribed to patients treated solely through telemedicine. Also, Schedule II–V controlled substances may not be prescribed to treat chronic non-malignant pain based solely on telemedicine encounters, and prescriptions may not be prescribed based solely on online questionnaires, as this does not qualify as an acceptable standard of care.

Next, providers can feel confident that patients who are insured will have insurance coverage for care provided in a telehealth format. West Virginia HB 4003 went into effect in June 2020 and requires health insurers to cover telehealth services just as they do face-to-face treatments, allowing providers and patients to socially distance as necessary. The West Virginia code defines telehealth as "the use of synchronous or asynchronous telecommunications technology by a health care practitioner to provide health care services, including, but not limited to, assessment, diagnosis, consultation, treatment, and monitoring of a patient; transfer of medical data; patient and professional health-related education; public health services; and health administration. The term does not include audio-only telephone calls, email messages, or facsimile transmissions."

Although audio-only telephone calls are not included in the definition of telehealth, in March 2020, the West Virginia Bureau for Medical Services issued a memorandum allowing telehealth services to be rendered through live video conferencing or telephonic service. The goal of allowing these services via audio-only telephone calls is to ensure patients can remain safe and stable during the COVID-19 pandemic while still maintaining access to needed telehealth services. The statute requires health insurers issuing or renewing policies beginning July 1, 2020, to cover any telehealth services that they would reimburse if the services were provided in person. Insurers are also not permitted to impose lifetime or annual benefit restrictions or cost-sharing for telehealth services, unless the same limitations are in place for in-person treatments. This law should go a long way towards reshaping the possibilities for telehealth in West Virginia. During the COVID-19 pandemic, this law helps ensure that patients get continuing access to medical care, despite closures and stay-at-home orders. The law appears to endure even after the pandemic, meaning that telehealth coverage will continue to be robust for West Virginians.

Another important change regarding telehealth has been made at the federal level: HHS Office for Civil Rights, the agency that enforces HIPAA, has made clear that it will not enforce the Privacy Rule against providers who are using telehealth in good faith during the pandemic. For instance, providers may use their phones or tablets to deliver telehealth services from their homes without worrying about whether a household member may hear private health information. Providers are also free to use certain apps like Facebook Messenger, FaceTime, Google Hangouts, Zoom, or Skype to deliver care to their patients, even though these third-party apps pose some privacy risks. However, providers are not to use public-facing apps like Facebook Live, Twitch, or TikTok (for providers who are hip enough to know what those apps are).

Ultimately, telehealth is going to continue to be of paramount importance in the months and years to come. These laws are designed to enable providers to deliver the care their patients badly need while ensuring quality, privacy, and affordability. Your patients want to see you in person soon, but in the meantime, a Skype visit may be just what the doctor ordered.

W. VA. CODE ANN. § 30-14-12d(d)—(e) (LexisNexis 2020).
§§ 30-1-1, 3-13a, 14-12d (2020), W. VA. CODE R. § 17-3-23 (2020).
§§ 30-3-13a, 14-12d (2020).
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§ 30-14-12d(e) (2020).
§ 30-1-26 (2020).
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Notification of Enforcement Discretion for Telehealth Remote Communications During the COVID-19 Nationwide Public Health Emergency, DEP'T. HEALTH & HUM. SERVS. (2020), https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html.

SCIENTIFIC

POTENTIALLY AVOIDABLE ACUTE CARE PATIENT TRANSFERS TO A RURAL ACADEMIC MEDICAL CENTER

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Short Title:

Potentially Avoidable Acute Care Patient Transfers

Key Words:

Inter-hospital Transfers, Care Transitions, Hospital Utilization

ABSTRACT

Though inter-facility acute care patient transfers from resource-limited rural hospitals are necessary, it is desirable to minimize them for several reasons. Some transfers might be potentially avoidable with appropriate pre-transfer teleconsultation.

We conducted a retrospective record review of adult patient transfers to our rural academic medical center for medical-surgical services or critical care to estimate the frequency of potentially avoidable patient transfers and to identify any requested specialty that was more often associated with potentially avoidable patient transfers. Excluded were patients transferred via trauma network or for obstetrics care. Transfers were judged potentially avoidable if resulting in live discharge within 48 hours without procedures or intensive care. We studied patient demographics and transferring facility characteristics.

We examined 1,180 transfers between June 2016 and January 2017 and judged 21.6% (N=255) potentially avoidable. Transfers for Neurology consultation were 2.5 times (95% CI 1.2 - 5.0) more likely to be avoidable relative to transfers for General Surgery. Neurology was the only specialty associated with a greater likelihood of potentially avoidable transfers than the comparator specialty.

A significant proportion of inter-facility patient transfers to our facility are potentially avoidable. Neurology-related transfers might warrant pre-transfer teleconsultation.

INTRODUCTION

Approximately 1.5% of the estimated 129 million emergency department (ED) patient encounters in the United States in 2009 resulted in transfer to another acute care facility.[1] A retrospective cross-sectional analysis of U.S. ED visit transfers from 1997 through 2009 revealed a 1.8% rate of inter-facility transfer.[2] That inter-facility transfers are beneficial has been demonstrated by several studies.[3-6] However, they also carry

disadvantages since they increase costs and place travel-related burdens on patients and their families. There is also evidence that inter-facility transfers can be risky.[7-13] Moreover, patient transfers can weaken the survivability of rural hospitals by lowering occupancy rates.[14]

Therefore, it may be desirable to minimize inter-facility transfers from smaller rural hospitals to larger ones. However, such inter-facility transfers will be necessary as long as there are resource disparities amongst hospitals, especially true in rural areas. The rate of inter-facility transfers in the rural US was twice that of the overall national rate in 2009.[1] Resource disparities for stroke management, for example, have been documented.[15,16] Nevertheless, potentially avoidable transfers might be reduced. To achieve this, rural hospital clinicians must have real-time pre-transfer con-sultation with a referral center. The University of New Mexico's telementoring program, ECHO and the U.S. Health Resources and Services Administration (HRSA) funding of the National Consortium of Telehealth Resource Centers (NCTRC), while examples of support for rural clinicians, are not real-time pre-transfer hospital consultations.[17,18] Providing this kind of services can be costly and challenging and rural, less affluent referral centers might only be able to offer them for selected specialties. The aim of our retrospective cohort study was to estimate the rate of potentially avoidable patient transfers to our rural academic medical center and to identify which specialty consultation services might be more often associated with potentially avoidable patient transfers than others. These specialties might be selected for pre-transfer consultation services.

The phenomenon of potentially avoidable inter-facility transfers of adult patients has been investigated to our knowledge in only 5 previously published studies.[19-23] In most, a transfer was defined as potentially avoidable if the patient was discharged from the receiving hospital's ED or after a hospital stay of less than 48-72 hours or if they did not undergo specialized diagnostic or interventional procedures. A few studies made direct comparisons between potentially avoidable and unavoidable transfers and identified the following characteristics as being important; patient's insurance status,[19] reason for transfer[22,23] and severity of illness upon arrival.[23] In addition, one study noted that certain facilities made potentially avoidable transfers more often than others.[19]

METHODS

We conducted our study at Cabell Huntington Hospital (CHH), a not-for-profit 303-bed academic medical center in Huntington, West Virginia, population 47,079.[24,25] It is a regional referral center for a rural tristate area encompassing south-central West Virginia, southern Ohio and eastern Kentucky. We obtained permission from CHH's admin-istration and institutional review board (IRB) to conduct a retrospective chart review.

All patient transfers to CHH are coordinated through a central Transfer Center which is staffed continually by critical care registered nurses. These transfer coordinators obtain patient information from the transferring facility, convey it to the appropriate receiving physician and enter it into the Transfer Center's computer database. Their handwritten notes are also stored at the Transfer Center.

We included adult patients (18 years or older) transferred from any facility, whether or not it was a hospital or had an emergency department, to CHH for medical-surgical services or critical care from June 1, 2016 and January 31, 2017. Due to resource limitations we could not extend the study period for the whole year. We excluded patients transferred specifically via the trauma network or for obstetrical care.

We defined a patient transfer as potentially avoidable if it met all of the following criteria at CHH: live discharge with 48 hours or less length of stay (including ED discharges), no intensive care unit (ICU) stay, no operating room, endoscopy or interventional radiology procedure suite visits.

In comparing desired specialty services we designated General Surgery as the benchmark because this specialty had the broadest scope of practice amongst the most sought-

POTENTIALLY AVOIDABLE ACUTE CARE PATIENT TRANSFERS TO A RURAL ACADEMIC MEDICAL CENTER

after specialties. We examined both patient-specific explanatory variables: age, gender, health insurance status; and transferring facility-specific variables: high-volume ED status (40,000 or more annual visits in the preceding year), facility's distance from CHH, its county's population, the number of primary care providers per 1,000 county population, its median county income, and its proportion of the total number of transfers in the study period. We hypothesized that busier transferring facilities located in more populous, affluent, better-served communities might be more likely to make potentially avoidable transfers than less-endowed facilities. We also supposed that facilities closer to CHH might be more likely to originate potentially avoidable transfers than more distant ones given the convenience of proximity. We included each facility's proportion of total transfers because a more established and convenient transfer pattern to CHH might foster a higher likelihood for potentially avoidable transfers.

We obtained annual ED visit data from the facilities themselves, calculated distances using Google Maps, used the Federal Reserve Bank of St. Louis economic database for county income, U.S. census data for populations and the West Virginia Rural Health Association's database for primary care provider numbers.[26-29] Additionally, we noted whether or not the referring provider was a physician.

We analyzed the data using the Chi-squared test for individual comparisons with the outcome variable involving categorical variables and the Students t-test, with confirmation with the Wilcoxon Rank sum test, to compare continuous variables. We performed multivariate logistic regression to examine the effect of the desired specialty on the outcome variable while simultaneously adjusting for the other explanatory variables listed. All tests of significance were performed using a two-tailed alpha of 0.05. We used Stata 15.0 (College Station, TX.)

RESULTS

We studied 1,180 patient transfers to CHH, designating 255 of them (21.6%) as potentially avoidable. The sample was evenly divided between men and women (52.2% *vs* 47.8%.) The mean age was 58.2 years (range: 18 years – 99 years.) All but 77 (6.5%) of the transferees were insured. In 88.3% (1,042) of cases the transferring provider was a physician. The patients were transferred from 59 different facilities; 38 (64.4%) in West Virginia, 13 (22%) in Kentucky and 8 (13.6%) in Ohio. The number of transfers from each facility ranged from 1 to 186 (mean:20.) Approximately one third of the transfers with available data (379 out of 953) were from hospitals with 40,000 or more annual ED visits. The mean distance travelled to CHH was 58.4 miles (range: 0.2 miles – 228 miles.) The facilities were distributed over 35 counties; 21 West Virginia counties and 7 counties in Kentucky and Ohio respectively. The mean population of the counties was 57,162 (range: 7,772 – 192,591.) On average, each county had 1.9 primary care provider per 1000 population (range 0.2 - 6.4.) The average county median income was $36,327.

Potentially avoidable transfers were significantly different from unavoidable transfers regarding several transfer characteristics (Table 1.) The avoidable transfer group had a lower mean age (52.9 years *vs* 59.7 years, $P < .001$,) were from closer facilities (53.9 miles *vs* 59.6 miles, $P = .01$,) and had a higher mean county population (60,826 *vs* 56,152, $P = .03$) than the unavoidable transfer group.

There were a total of 29 specialty services desired by the transferring clinicians. Six specialties accounted for 67.5% of the transfers, the remaining 23 specialties each being

TABLE 1

Transfer Characteristics

	Percentage of transfers (No.) unless specified		
	Avoidable Transfers (N = 255)	**Unavoidable Transfers (N=925)**	**P value**
Patient Characteristics			
Male Gender	52.6 (134)	52.1 (482)	0.95
Mean Age in years (SD)	52.9 (18.6)	59.7 (17.0)	< 0.001
Insurance Insured Uninsured Other*	 91.0 (232) 8.6 (22) 0.4 (1)	 93.2 (862) 6.0 (55) 0.9 (8)	 0.28
Referring Hospital Characteristics			
Annual ED Visits ≥40,000	43.8 (85)	38.7 (294)	0.22
Annual Inpatient Days (SD)	33 906 (35 711)	35 786 (43 228)	0.55
Mean County Population (SD)	60 826 (38 606)	56 152 (38 197)	0.03
Mean Median County Income (SD)	35 989 (5 262)	36 419 (5 110)	0.24
PCP's per 1,000 county population (SD)	2.0 (1.1)	1.8 (1.1)	0.09
Mean Distance from AMC in miles (SD)	53.9 (34.8)	59.6 (31.8)	0.01
Hospital Referral Contribution Low (1st quartile) Medium (2nd quartile) High (3rd quartile)	 23.1 (59) 29.0 (74) 47.9 (122)	 27.1 (251) 23.9 (221) 49.0 (453)	 0.19
Referring Clinician: Physician	86.7 (221)	88.8 (821)	0.38

SD = Standard Deviation; ED = Emergency Department; PCP = Primary Care Provider; AMC = Academic Medical Center;

Numbers in parentheses are counts unless otherwise specified.

** Other: Worker's Compensation, Tricare/CHAMPUS, CHAMPVA*

requested in fewer than 5% of the transfers. Neurology consultation requests, the most frequent specialty request among the potentially avoidable transfers (27.1%,) were 2.5 times more likely to be associated with potentially avoidable transfers than were requests for general surgery consultation (Table 2.) No other specialty requests were positively correlated with potentially avoidable transfers.

DISCUSSION

The estimated rate of potentially avoidable inter-facility transfers in our study (21.6%) is consistent with the results of other studies with similar defining criteria.[21-23] Apart from one exception which studied transfers for multiple surgical specialties[22], prior studies have each only considered a single specialty: Orthopedics[19], Pediatrics[20,25], Trauma Surgery[21], Neurosurgery[23] and Plastic Surgery[24]. Our study is the first to explore possible associations between potentially avoidable patient transfers and multiple requested medical and surgical specialties and the first to discover a strong association with Neurology compared to General Surgery.

Our study is subject to several limitations. Firstly, there not being a gold standard definition of avoidable transfers, our definition, though based on prior research, might have been too strict. For example, we did not account for diagnostic radiology availability at the referring center or patient co-morbidities. Secondly, we deliberately included transfers from all facilities including long-term care facilities and rehabilitation and psychiatric hospitals in order that our findings might be based on real-world experience and therefore applicable generally. However, this sample heterogeneity potentially introduces unrecognized confounding factors. Thirdly, our sample size, though over 1000, was insufficient for the large number of requested specialties. Finally, the findings of our single-center study are most applicable only to our center. This limited generalizability might be necessary if the interventions to reduce potentially avoidable transfers are also limited to a single referral center. However, if the burden of intervention might be more feasibly shared amongst several referral centers in a region, a multi-center study might be more appropriate.

These limitations suggest many methodological refinements for future study: using patient co-morbidity measures and post-discharge patient outcome data in defining potentially avoidable transfers; increasing the sample size and possibly extending the study to include other rural regional referral centers. Also, limitations notwithstanding, we have shown that a proportion of acute care patient transfers in a rural setting are potentially avoidable. While our data cannot be definitive it is reasonable to suppose that neuro-hospitalist pre-transfer teleconsultation might reduce potentially avoidable transfers to our academic medical center from smaller rural hospitals.

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TABLE 2

Desired Specialties and Likelihood of Potentially Avoidable Transfers

Specialty	% All Transfers (N = 1 180)	Unadjusted Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio* (95% Confidence Interval)
General Surgery	8.5 (101)	Referent	Referent
Critical Care	20.1 (237)	0.17 (0.07 – 0.39)	0.13 (0.05 – 0.37)
Neurology	15.4 (182)	2.63 (1.47 – 4.71)	2.48 (1.22 – 5.05)
Neurosurgery	9.5 (112)	0.77 (0.38 – 1.58)	0.78 (0.32 – 1.89)
Gastroenterology	7.4 (87)	0.38 (0.15 – 0.95)	0.41 (0.12 – 1.35)
Orthopedics	6.5 (77)	1.13 (0.54 – 2.38)	1.08 (0.44 – 2.60)
Other	32.5 (384)	1.91 (1.11 – 3.30)	2.14 (1.10 – 4.15)

**Multivariate regression analysis included patient's age, gender, insurance status; referring facility's emergency department volume, inpatient days, contribution to total transfers, distance from referral center; referring facility's county population, median income, primary care provider density.*

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DR. SPORCK RETIRES AS EDITOR

Aaron Sporck

Some children enter adulthood with hopes to step into their parents' shoes. With my dad it wasn't so much deciding whether or not to follow in his footsteps but deciding which set of shoes to step into. I've always thought of dad as the quintessential "Renaissance Man" and always admired how he could move from discussions of medicine to history to theology to politics while maintaining the same level of knowledge. Above all, dad has dedicated his life to helping others in need and his example instilled the same core value in me.

My decision to not continue in the family business of medicine may have surprised some, but those who truly know my father know that in a way I was following in his footsteps by pursuing a career in politics. Although his professional career was devoted to the practice of medicine, for as long as I can remember, my father had a keen interest in politics and being engaged in public discourse.

As a child, I vividly remember his trips to Washington, D.C. to meet with West Virginia's Congressmen and Senators to discuss issues important to the medical community in the state. He was also actively involved in working with the West Virginia Legislature and Gubernatorial Administrations to ensure that physicians had a seat at the table during policy development. When I was old enough, I started to accompany him on his trips

to the state capitol and to Washington. One legislative session he made arrangements for me to serve as a page at the state capitol, an experience that truly sparked my interest in the legislative process.

Dad continued to nurture my curiosity about politics with future trips to Washington and introduced me to our state's leaders. In college I expressed an interest in spending the summer between my junior and senior years in Washington as a Congressional intern. After graduating from college, I went on to live in Washington for 14 years and work in politics. Whenever I would drive by the beautiful monuments in our nation's Capitol I would think of dad and how he introduced me to politics. I am forever grateful for dad's encouragement and support of my career choice.

In 2017, when dad announced that he was retiring from his medical practice, he was able to reflect on a career in medicine that spanned nearly five decades. Throughout his career he always balanced managing a growing medical practice, while at the same time demonstrating compassion by providing care to those in need. I remember times that he would bring home coolers of produce or trout that patients gave him, who did not have the financial means to compensate him for the care he provided. When I was in high school I volunteered at St. Francis Hospital and remember con-

versations with the nursing staff about how my father took the extra step to spend time with patients and their families, explaining the risks of procedures to make sure they had comfort.

Several years ago my job enabled my wife and I to move back to Charleston. I travel quite a bit for work and frequently run into dad's former colleagues and patients who always ask about how he is doing in retirement. I really enjoy these conversations. Hearing their stories about dad continues to give me a great sense of pride. Regardless of who I'm speaking with, these individuals share their stories of dad caring for patients and their families, helping those in need, and being a strong and ethical leader.

Earlier this year, when dad told me he was stepping down as Editor of the *West Virginia Medical Journal*, I reflected on the legacy he is leaving, not only with the *Journal*, but in the broader medical community. Dad has always enjoyed being an active leader in the West Virginia State Medical Association and cherished being the Editor of the *Journal*. I know he will miss this responsibility and will certainly contribute on occasion.

As I have watched dad wind down his professional career, I know that he is most excited about focusing on the jobs that have always been the most important to him: husband, father, and now grandfather. Although he will always be Dr. Sporck, he is most proud to be "Poppy" to his grandchildren: Caroline, Jacob, Sam, and Luke. I am looking forward to rounds of golf with him and sharing many thought provoking conversations.